

ABSTRACT

Electro-optical Modulators and Methods of Modulating Optical Signals

A single-drive electro-optic Mach Zehnder modulator comprises a body of an
5 electro-optically active material; optical waveguides are formed at least partly in that
material and constitute a Mach Zehnder interferometer having two limbs providing
alternative light paths between an input and an output so that interference may occur
between light taking the alternative paths on recombination at the exit. At least two sets of
three (or more) electrodes are provided, for subjecting longitudinally spaced sections of the
10 limbs in "push-pull" to an electric field, and in at least one of the sections the waveguides of
the two limbs are coupled.

In use, an electrical radio-frequency signal conveying the data to be modulated onto
an input continuous-wave light beam will be applied to one set of electrodes in the usual
way, and a D C electrical bias, independent of any D C bias applied to those electrodes, will
15 be applied to the other set, where the waveguides are coupled.

Chirp can be adjusted over a wide range to accommodate planned or unexpected
changes in the operating conditions of the optical transmission installation in which the
modulators are used, and the need to manufacture and stock multiple types of modulator
differing in chirp value is substantially reduced, if not completely eliminated.

20 In some forms of the invention, the additional D C bias electrodes are positioned
where the voltage they apply will affect the relative amplitude and relative phase of light in
the two limbs.